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Title	Proficiency-based progression training: an 'end to end' model for decreasing error applied to achievement of effective epidural analgesia during labour: a randomised control study
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Metrics for labor epidural catheter placement

Start of procedure: Anaesthetist entering the room

End of procedure: Anaesthetist leaving the room after completion of the procedure

Metrics

I. Initial patient interaction
II. Positioning
III. Maintaining asepsis
IV. Preparation and positioning of equipment
V. Handling sterile epidural preparation field and disinfection of epidural insertion site
VI. Identifying appropriate interspinous space after fenestrated drape
VII. Local infiltration
VIII. Needle insertion /Attachment of loss of resistance (LOR) syringe/identifying LOR
    a) Attachment of LOR syringe and advancement of needle
    b) Attempts in first interspinous space
    c) Subsequent attempts
IX. Catheter insertion
X. Test dose and securing the catheter
XI. Loading dose and assessment of block

No	**Metrics and definition (Task/subtask)**	Error
I:	**Initial patient interaction**	Error
1	**Does not explain the procedure**	
2	**Does not explain risks involved**	
3	**No verbal consent obtained**	
II:	**Positioning**	Error
4	**Patient not positioned at the edge of the bed**	
5	**Patient not positioned in the middle third of the bed**	
6	**Bed not flat and parallel to floor**	
7	**Does not establish a clear working environment (eg: one or more of the following things not done appropriately- dress taped, CTG monitor belt moved away from field , IV lines and monitor cables away from the working field)**	
III:	**Maintaining asepsis (refer to table at the end please)**	
IV:	**Preparation and positioning of equipment**	Error
8	**Does not position the trolley within 90 degree arc**	
9	**Does not attempt to identify the landmarks (palpates iliac crest with both hands and identifies midline) prior to scrubbing**	
V:	**Handling sterile epidural preparation field and disinfection of epidural insertion site**	Error
10	**Does not check drug name and expiry with midwife**	
11	**Does not use filter needle to draw up local anesthetic for test dose or saline to be used for loss of resistance**	
12	**Does not flush epidural catheter with filter attached(not necessarily removing catheter from pack)**	
13	**Does not prep the back appropriately (Betadine circular motion from center Alcohol horizontal movements)**	

14	**Failure to prep appropriate amount of area (A4 size)**	
15	**Does not give adequate time for antiseptic solution to act (application of antiseptic to insertion of needle – 3 min for betadine and 60 sec for chlorhexidine skin preparation stick)**	
16	**Placing fenestrated drape without removing adhesive tape both from center hole and top**	
17	**Does not get a new drape if position of drape is to be adjusted**	
VI:	**Identifying appropriate interspinous space after fenestrated drape**	Error
18	**Does not request patient to arch the back**	
19	**Does not identify landmarks again(palpates iliac crest and/or palpate midline) prior to local infiltration**	
20	**Landmark reconfirmed > 5 times**	
VII:	**Local infiltration**	Error
21	**Does not dry betadine (after 3 minutes) if still wet prior to infiltration of local anaesthetic**	
22	**Uses more than 5 ml of lignocaine for skin infiltration**	
23	**Does not give adequate time for local anaesthetic to work (90 sec)**	
VIII	**Needle insertion / Attachment of loss of resistance (LOR) syringe / Identifying LOR**	
a)	**Attachment of LOR syringe and advancement of needle**	Error
24	**Direction of insertion downward or? > 45 degree cephalad**	
25	**Stylet of epidural needle not placed in sterile field**	
26	**Connects loss of resistance syringe with more than half barrel of air**	
b)	**Attempts in first interspinous space**	Error
27	**More than 2 passes in the same direction**	
28	**Alteration in direction not limited to single plane in any new pass**	

29	**Second attempt in the same space without change of angulation in either or both planes**	
30	**More than 5 minutes in same attempt**	
c)	**Subsequent attempts**	Error
31	**Does not wait for local anesthetic to work**	
32	**Does not prep again if drape is removed**	
33	**Undertakes an attempt in an unprepared and unsterilized interspace**	
34	**On seeing blood in epidural needle, the anaesthetist proceeds with the same needle without flushing with saline or changing the needle**	
35	**Injects more than 0.5 ml of air**	
36	**Returns syringe to any place other than sterile field***	
IX:	**Catheter insertion**	Error
37	**Threads catheter during contraction**	
38	**Inserts catheter with caudal angulation or direction**	
39	**Does not stabilize needle while passing catheter**	
40	**Pulls catheter back through needle**	
41	**Advances needle over catheter at any point**	
42	**Rotates epidural needle after catheter insertion**	
43	**Inserts epidural catheter without mentioning paresthesia to the patient**	
44	**Does not place epidural needle back in sterile "TRAY"**	
45	**Failure to aspirate catheter "gently" with 2 ml syringe prior to fixing**	
46	**Continues to administer local anaesthetic with blood in the catheter**	
47	**If there is blood in catheter does not perform one of the following options – A) pull back by 1 cm and re aspirate up to 2 times. B)Pulls catheter out C) Flush catheter with saline up to 2 times**	
48	**Injecting local anaesthetic to flush blood in catheter**	
49	**If CSF in catheter is suspected does not perform one of the following actions – A) Take out the catheter. B) Use it as a spinal catheter**	

50	**Proceeds to inject local anaesthetic dose of >5ml despite aspirating clear fluid in the epidural catheter**	
X:	**Test dose and securing catheter**	Error
51	**Does not loop the catheter or use fixating device for taping**	
52	**Tapes less than half way up the back**	
53	**More than 3 ml of Test dose (2% Lidocaine) administered**	
54	**Administers test dose during contraction**	
XI:	**Loading dose and assessment of block**	Error
55	**Does not ask patient for symptoms for intravenous local anesthetic prior to loading dose**	
56	**Failure to assess possibility of inadvertent intrathecal injection of local anaesthetic (failure to ask or identify sensory/motor symptoms prior to loading dose)**	
57	**Does not check blood pressure prior to loading dose**	
58	**Does not check the local anaesthetic solution used for loading dose(name and expiry date)**	
59	**Administers less than 10 ml to more than 20 ml of loading dose**	
60	**Does not communicates with patient during loading dose**	
61	**Fails to disconnect syringe containing local anaesthetic from epidural apparatus following completion of administration of loading/test dose**	
62	**Failure to ensure that filter hub is kept sterile**	
63	**Does not document BP prior to leaving the room**	
64	**Anaesthetist leaves the room without hearing that the patient is getting more comfortable during contractions**	

	Maintaining asepsis	Stage VI	Stage VII	Stage VIII	Stage IX	Stage X	Stag e XI
65	**Not bare below elbow except wedding ring (exception – if wearing sterile apron)**						
66	**Hand wash not done as per guidelines (alcohol gel if no visible contamination of hand for 90 sec / scrubbing with antiseptic soap)**						
67	**Not maintaining asepsis during donning of sterile gloves and/or not changing sterile gloves if it is contaminated during the procedure**						
68	**Not observing and changing equipment if it gets contaminated**						
69	**Fenestrated drape contaminated and not replaced**						
70	**Betadine solution cup/ sponge holding forceps/Chlorhexidine stick /gauze used to dry betadine - left in sterile field after use**						
71	**Any equipment placed in patient drape instead of the sterile field***						
72	**Unsheathed needle placed outside sterile "TRAY"****						
73	**Re-sheathing needle any time during the procedure**						
74	**Using sterile gloves in unsterile area after completion of sterile procedure without removing or changing the gloves**						

*Sterile field – area within sterile drape used for epidural preparation

**Sterile plastic tray – plastic cup/tray within epidural preparation field

Text in red point to critical errors